

**APPLICATION
COASTAL NONPOINT SOURCE GRANT PROGRAM – 2005**

Request for Responses: ENV 05 CZM 03

Cover Sheet

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Project Title: **Urban Stormwater and Low Impact Development Model Ordinance & Best Development Practices Guidebook**

Amount Requested: **\$34,500**

Match Amount: **\$11,500**

Total Project Cost: **\$46,000**

Project Summary (briefly describe the proposed project in one or two short paragraphs):

The negative impacts of urbanization on coastal waters have been well documented. Nearly all water bodies that receive Salem's stormwater are impaired despite the City's continual efforts to improve water quality through infrastructure improvement projects and NPS assessments. With the steady demand for housing and industry, Salem needs to develop and adopt an Urban Stormwater and Low Impact Development (LID) Ordinance to promote NPS control. The goal of this project is to develop a tool that will give the City of Salem greater control of water quality and quantity by regulating drainage and stormwater runoff from construction projects smaller than one acre and encouraging the principles of LID and smart growth. Several City departments and boards, including the Board of Health, the Conservation Commission, Department of Public Services, Planning Board, and Building Department, will collaborate to create the Urban Stormwater and LID Ordinance and a Best Development Practices Guidebook based on this Ordinance to assist contractors with development and redevelopment in the City of Salem. Once the Ordinance is fully developed it will be presented to the City Council for adoption into the City of Salem Code of Ordinances. This project would provide the Executive Office of Environmental Affairs agencies with the opportunity to assist with the development of a nonpoint source pollution management tool that can be easily transferred to other urban communities. In Massachusetts there is no model ordinance or bylaw for NPS control based on LID principals in a dense urban environment.

TABLE OF CONTENTS

SECTION	PAGE NO.
1. NONPOINT SOURCES OF POLLUTION AND WATERS OF CONCERN	1
1.1 Site Location.....	1
1.2 Impacts of Urbanization on Coastal Waters	2
1.3 Pollutants of Concern in Salem	3
1.3.1 Massachusetts Year 2004 Integrated List of Waters	3
1.3.2 Massachusetts DEP DWM and DMF Reports on Salem Sound.....	4
1.3.3 Salem Sound Coastwatch Clean Beaches and Streams Program	5
2. NATURAL RESOURCES AND RECREATION	6
2.1 Aquatic Life.....	6
2.2 Primary Contact Recreation	6
2.3 Shellfishing	6
2.4 Aesthetics	6
3. PROPOSED PROJECT	7
3.1 Project description	7
3.2 Project Deliverables.....	8
3.2.1 Urban Stormwater and Low Impact Development Ordinance	8
3.2.2 Best Development Practices Guidebook	9
3.2.3 "How To" Guide for Urban Communities	9
3.3 Scope of Work	9
3.4 Project Timeline.....	12
4. PROJECT RESULTS.....	13
5. BUDGET DETAILS	14
6. PUBLIC SUPPORT.....	15

LIST OF TABLES

TABLE	PAGE NO.
Table 1-1: Land Use Summary Statistics for Salem, MA.....	1
Table 1-2: List of Impaired Waters in Salem, MA	3
Table 3-1: Scope of Work Summary Table.....	11
Table 3-2: Project Timeline.....	12
Table 5-1: Itemized Budget Breakdown.....	14

APPENDICES

Appendix A:	Maps
Appendix B:	Water Quality Data
Appendix C:	Resumes
Appendix D:	Standard Forms
Appendix E:	Letters of Support

1. NONPOINT SOURCES OF POLLUTION AND WATERS OF CONCERN

Describe the known or perceived sources of NPS pollution and the pollutants of concern; what is the receiving water(s) and Massachusetts coastal water(s) of concern.

1.1 SITE LOCATION

The location of Salem, Massachusetts is depicted in the Site Locus map in Appendix A. Salem is located entirely within the North Coastal Drainage Basin. A map of this watershed, created by the United States Geological Survey (USGS) is provided in Appendix A. Stormwater is collected and subsequently discharged to the Atlantic Ocean at various points along the coast. Several rivers and streams drain inland portions of the City, such as Danvers River, North River, Proctor Brook, South River, and Forest River. All of this fresh water flows into either Beverly Harbor or Salem Harbor, which are part of Salem Sound.

The City of Salem has a population of 40,407 people according to the 2000 U.S Census. The total land area is only 8.11 square miles. The majority of Salem is developed and developed land is a densely populated (4,986 people per square mile) urban environment. Table 1-1 summarizes the changes in land use between 1971 and 1999 according to the Land Use Summary Statistics compiled by the Massachusetts Geographic Information System (MassGIS) in 2003.

Table 1-1: Land Use Summary Statistics for Salem, MA

Land Use	Change in Acres 1971 - 1999	% Change 1971 - 1999	Total Acres 1999	% Total Landuse
Crop Land	0.0	0.0%	4.6	0.1%
Pasture	-0.6	-5.9%	9.8	0.2%
Forest	-203.0	-18.4%	903.2	17.3%
Non-forested Wetlands	-1.7	-1.1%	156.6	3.0%
Mining	11.6	36.3%	43.7	0.8%
Open Land	-258.5	-34.3%	495.3	9.5%
Participation Recreation	26.4	7.6%	371.9	7.1%
Spectator Recreation	-4.8	-45.7%	5.7	0.1%
Water-based Recreation	2.0	11.5%	19.4	0.4%
Multi-family Residential	174.0	894.4%	193.5	3.7%
High Density Residential	6.5	0.5%	1193.6	22.9%
Medium Density Residential	95.9	23.3%	507.9	9.7%
Low Density Residential	1.5	3.7%	41.7	0.8%
Salt Water Wetlands	0.0	0.0%	11.6	0.2%
Commercial	101.5	39.0%	361.7	6.9%
Industrial	39.3	31.5%	163.9	3.1%
Urban Open	26.4	6.5%	430.6	8.3%
Transportation	-12.0	-5.4%	210.6	4.0%
Waste Disposal	-4.4	-20.7%	16.7	0.3%
Water	0.0	0.0%	74.9	1.4%
Total Area			5217	100%

Source: MassGIS. Land Use Summary Statistics. September 2003.

In 1999, land uses associated with impervious surface areas with very little groundwater recharge (i.e., residential, commercial, industrial) made up over 50% of Salem's total area. Much of the residential and commercial area in Salem is along the coast. Forest area and open land significantly *decreased* between 1971 and 1999 (203 and 259 acres lost, respectively) while residential, commercial, and industrial land area greatly *increased* (278, 102, and 39 acres gained, respectively). Appendix A contains a Land Use map for reference.

1.2 IMPACTS OF URBANIZATION ON COASTAL WATERS

The US Environmental Protection Agency (EPA) report entitled, *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* (EPA 840-B-92-002), prepared in January 1993, was used as a reference for this section.

The negative impacts of urbanization on coastal and estuarine waters have been well documented in a number of sources, including the Nationwide Urban Runoff Program conducted in the early 80's. During urbanization, vegetated and open forested areas are converted to land uses that usually have increased areas of impervious surface, resulting in increased runoff volumes and pollutant loadings. Furthermore, in heavily populated areas, redevelopment and very small construction projects within a developed area can further increase the amount of impervious area. Urbanization typically results in changes to the physical, chemical, and biological characteristics of the watershed. As population density increases, there is a corresponding increase in pollutant loadings generated from human activities.

Hydrologic and hydraulic changes occur in response to site clearing, grading, and the addition of impervious surfaces and maintained landscapes. Most problematic are the greatly increased runoff volumes and the ensuing erosion and sediment loadings to surface waters that accompany these changes to the landscape. Uncontrolled construction site sediment loads have been reported to be on the order of 35 to 45 tons per acre per year. Loadings from undisturbed woodlands are typically less than 1 ton per acre per year.

After construction is complete, hydrological changes to the watershed are magnified. Impervious surfaces (i.e., rooftops, roads, parking lots, and sidewalks) decrease the infiltrative capacity of the ground and result in greatly increased volumes of runoff. In addition, major snowmelt events can produce peak flows as large as 20 times initial flow runoff rates for urban areas. Changes in stream hydrology resulting from urbanization compared to predevelopment conditions include the following:

- Increased peak discharges;
- Increased volume of urban runoff produced by each storm;
- Decreased time needed for runoff to reach the stream (i.e., decreased time of concentration);
- Increased frequency and severity of flooding;
- Reduced streamflow during prolonged periods of dry weather due to reduced level of infiltration in the watershed (i.e., decreased baseflow); and
- Greater runoff velocities.

Nonpoint source pollution has been associated with water quality violations and the impairment of designated uses of surface waters. The major pollutants found in runoff from urban areas include **sediment, nutrients, oxygen-demanding substances, pathogens, road salts, hydrocarbons, heavy metals, and toxics**. Many of these pollutants result in adverse effects on aquatic and benthic life.

1.3 POLLUTANTS OF CONCERN IN SALEM

The following documents were used as a reference for this section. In many cases, the text of these reports was paraphrased or quoted to more fully capture the meaning of the discussion.

- Massachusetts Department of Environmental Protection (MA DEP), Division of Watershed Management. *Massachusetts Year 2004 Integrated List of Waters*. Proposed April 2004.
- MA DEP, Division of Watershed Management. *North Coastal Watershed 1997/1998 Water Quality Assessment Report* (Report #: 93-AC-1). May 2000.
- Massachusetts Division of Marine Fisheries (DMF). *The Marine Resources of Salem Sound, 1997*. October 2002.
- Salem Sound Coastwatch. *Clean Beaches and Streams Program Summary Report, Summer 2003*.

Based on reviewing these documents, nonpoint source (NPS) pollution is a major contributor to the poor water quality in the waters in and surrounding the City of Salem. The perceived source of NPS pollution in Salem is urban stormwater runoff. The pollutants of concern are all pollutants associated with urban NPS pollution (i.e., **sediment, nutrients, oxygen-demanding substances, pathogens, road salts, hydrocarbons, heavy metals, and toxics**). Supporting information that substantiates the water quality and water quantity challenges in Salem is presented in this section.

1.3.1 Massachusetts Year 2004 Integrated List of Waters

Many of Salem's waters are listed as Category 5 Waters on the proposed *Massachusetts Year 2004 Integrated List of Waters*. Waters listed in Category 5 constitute the 303(d) List and, as such, are reviewed by the EPA. Table 1-2 lists the pollutants of concern and all of the impaired water bodies affected by stormwater in Salem. These waters are shown on the Impaired Waters Map in Appendix A.

Table 1-2: List of Impaired Waters in Salem, MA

Water Body	Description / Location	Pollutant of Concern
Beverly Harbor	-	<ul style="list-style-type: none">• Organic Enrichment/Low DO• Pathogens
Danvers River	Confluence with Porter, Crane and Waters Rivers, Danvers to mouth at Beverly Harbor, Beverly/Salem	<ul style="list-style-type: none">• Pathogens
Forest River	Approximately ½ mile upstream of Loring Avenue, Salem to mouth at Salem Harbor, Salem/Marblehead	<ul style="list-style-type: none">• Organic Enrichment / Low DO• Flow Alteration• Pathogens
North River	Downstream of Route 114 Bridge, Peabody (Proctor Brook Becomes North River at this bridge) to confluence with Danvers River, Salem	<ul style="list-style-type: none">• Unionized Ammonia• Organic Enrichment / Low DO• Pathogens
Proctor Brook	Outlet of small pond in wetland north of Downing Road, Peabody to Goodhue Street bridge, Salem	<ul style="list-style-type: none">• Cause Unknown• Nutrients• Siltation• Pathogens

Water Body	Description / Location	Pollutant of Concern
Proctor Brook	Goodhue Street bridge, Salem to Route 114 culvert, Salem	<ul style="list-style-type: none"> • Pathogens
Salem Harbor	-	<ul style="list-style-type: none"> • Pathogens
Salem Sound	-	<ul style="list-style-type: none"> • Pathogens

1.3.2 Massachusetts DEP DWM and DMF Reports on Salem Sound

The Massachusetts Department of Environmental Protection (MA DEP) Division of Watershed Management (DWM) prepared the *North Coastal Watershed 1997/1998 Water Quality Assessment Report* in May 2000. According to this report, sections of the North Coastal Watershed in Danvers, Lynn, Salem, Gloucester, Peabody and Saugus have extensive areas of impervious surfaces created by dense housing developments, roads, commercial and industrial development and parking areas. The runoff from these areas alters the water quality and biological integrity of the resources that have been historically noted for smelt fishing, swimming and shellfishing.

The Massachusetts Division of Marine Fisheries (DMF) prepared *The Marine Resources of Salem Sound, 1997* in October 2002. This report assessed the current status of marine fishery resources and water quality in Salem Sound and compared the results to the 1965 Salem Sound DMF study and other relevant studies. According to this report, the watershed adjacent to Salem Sound is highly developed with urban and industrial landscapes found along some tributaries. During the last 50 years, the population has remained fairly stable but impervious surfaces have greatly increased. It is estimated that 66% of total nitrogen that enters Salem Sound originates from nonpoint land uses.

Data presented in the DMF report show that the water quality in Salem Sound is generally good; no SA violations of bottom water quality, little indication of marine eutrophication, diverse fish community, thriving lobster and striped bass fishery. The high tidal range and shallow depths result in favorable flushing, but there were concerns raised about the freshwater/saltwater interface due to the poor water quality in the freshwater tributaries to Salem Sound. High **fecal coliform bacteria** counts and **low discharge** occurred at most river stations. Of the five rivers sampled routinely (North, Porter, Crane, Waters Rivers, and Sawmill Brook), the North River had the highest geometric mean of 2009 col/100mL. North River also had the highest mean **total nitrogen (TN)** and **ammonium** of the three primary river stations (Crane, North, Porter Rivers).

The following is a brief summary of water quality conditions in Salem's waters based on these two reports in addition to pathogens and other Category 5 impairments listed above.

North River System

Sediment quality data from the 1987 and 1988 North Coastal Water Quality Surveys indicated very high concentrations of **heavy metals (Cr, Pb, and Zn)** and **polycyclic aromatic hydrocarbons (PAHs)** in the sediments of the North River system. The impacts observed in the late 1980's may well be attributable to toxic contaminants present in the sediments. The North River watershed also has **nutrient enrichment** and **sedimentation problems**.

The Proctor Brook segment from the outlet of the small pond north of Downing Road, Peabody to Goodhue Street Bridge, Salem (Segment MA93-39) is has multiple water quality concerns. The *Aquatic*

Life Use is non-support for the lower 1.0 mile reach (downstream from the confluence with Goldthwaite Brook) based on habitat quality limitations, nutrient enrichment, and the severely impaired benthic community. Nonpoint source pollution from runoff, trash, and the bordering industrial uses (historical and current) impact the aquatic community. The potential smelt spawning habitat in the North River system is “clearly degraded due to chronic pollution inputs. Discoloration and **oil sheens** in the water were commonly observed. Dead American eels (*Anguilla rostrata*) and sea worms (*Nereis*) were also observed on several occasions during DMF surveys” (DEP DWM 2000). **Nutrient levels** were elevated – the total phosphorous concentration ranged between 0.03 and 0.14 mg/L and ammonia nitrogen concentrations ranged from 0.10 to 0.58 mg/L. During all surveys conducted between July and November 1997 stream discharge was very low. Instream conductivity measurements were highest in the winter months and probably reflect road-salting practices. Fecal coliform bacteria levels were high on all DEP DWM (ranging between 640 and 50,000 cfu/100 mL) and DMF (all above 900 fcu/100mL) survey dates.

Forest River

The major water quality concern in the Forest River segment upstream of Loring Avenue, Salem to the mouth of Salem Harbor, as reported by DEP DWM and DMF, is heavy metals and the restriction of shellfishing. DMF conducted a study on **heavy metal** concentrations in soft shell clams (*Mya arenaria*) and found average **lead** concentrations in Forest River samples to be 10 times greater than the average from other Salem Harbor locations and samples collected from Boston Harbor. This habitat has been closed by DMF to all forms of digging because of gross contamination (Chase *et al.* 1994). DEP DWM conducted fecal coliform bacteria sampling in the Forest River (FRO1) on two occasions.

1.3.3 Salem Sound Coastwatch Clean Beaches and Streams Program

Salem Sound Coastwatch is a non-profit coastal watershed association that works with government agencies, businesses, other nonprofit organizations, and citizens from the communities of Manchester, Beverly, Danvers, Peabody, Salem, and Marblehead, Massachusetts. The Clean Beaches and Streams Program trains volunteers to help monitor water quality by collecting samples from prioritized shoreline sites (stormwater outfalls, coastal streams, etc.). Samples are then submitted to labs for bacteria testing. Testing is conducted every two weeks at the designated sites. The results are then shared with the watershed's municipalities as well as the public.

Based on the results of the Salem Sound Coastwatch *Clean Beaches and Stream Program Summary Report, Summer 2003*, the geometric mean **enterococci concentration** of available water quality testing results increased at nine (9) of 14 beaches when including rain events. In addition, the geometric mean enterococci concentration exceeded the Massachusetts state sanitary code standard of 35 col/100mL at six (6) of Salem's beaches when including rain events, compared to only three (3) when rain events were not included. This shows that nonpoint source pollution in the form of stormwater runoff is effecting the fecal coliform concentrations in Salem coastal waters.

2. NATURAL RESOURCES AND RECREATION

Document that natural resources and/or recreational uses are adversely affected by the NPS pollution problem.

The Massachusetts Surface Water Quality Standards designate the most sensitive uses (Aquatic Life, Fish Consumption, Primary and Secondary Contact Recreation, Shellfishing and Aesthetics) for which surface waters shall be protected. The following restrictions on sensitive uses for the waters in Salem can be attributed entirely or partially to nonpoint pollution in the form of urban stormwater runoff.

2.1 AQUATIC LIFE

According to the Massachusetts Division of Watershed Management, as described in the previous section, the lower 1.0 mile of Proctor Brook (Segment MA93-39) does **not support** the Aquatic Life Use as evidenced by habitat quality limitations, nutrient enrichment and a hyperdominated aquatic community.

2.2 PRIMARY CONTACT RECREATION

Based on Board of Health data there were a total of 36 beach closings in 2003, the largest number of beach closings experienced in the past nine years. Of the fourteen (14) beaches in Salem only three (3) continually met the standards necessary to remain open. There were 23 beach closings in 2004 at eight (8) of the eighteen (18) beaches monitored. Board of Health data from June 15, 1995 to September 8, 2004 is included in Appendix B.

The following waters in Salem have also been categorized as not fully supporting primary contact by the Massachusetts Division of Watershed Management due to elevated fecal coliform bacteria:

- Forest River (Segment MA93-10) is partially supported for Primary Contact.
- The lower 1.0 mile of Proctor Brook (Segment MA93-39) does not support Primary Contact.

2.3 SHELLFISHING

The three shellfish growing areas located along the coast of Salem (Salem Harbor, Danvers River, and Folgers/Peaches Point) have been classified as Prohibited by the Massachusetts Division of Marine Fisheries (DMF). Maps of these Designated Shellfish Growing Areas, produced by the Massachusetts DMF, are included in Appendix A. All of these waters (Salem Harbor, Beverly Harbor, Danvers River, Forest River, North River, Proctor Brook, Marblehead Harbor, and Salem Sound) are listed as Category 5 Waters for pathogens on the proposed *Massachusetts Year 2004 Integrated List of Waters*.

2.4 AESTHETICS

According to the Massachusetts Division of Watershed Management, as described in the previous section, the aesthetic quality in the lower 1.0 miles of Proctor Brook (Segment MA93-39) is poor due to “nonpoint source pollution runoff and degraded habitat from trash, debris and sedimentation.”

3. PROPOSED PROJECT

Explain the goal of the proposed project, the location and/or extent of the project; how, specifically, the project will address the NPS pollution problem; and what the perceived effects will be on the natural resources and users.

3.1 PROJECT DESCRIPTION

Nonpoint source pollution is a problem due largely to the quantity of densely populated urbanized land area in Salem and ever increasing impervious surface area. The negative impacts of urbanization on coastal waters have been well documented. Nearly all water bodies that receive Salem's stormwater are impaired due to one or more of the following; pathogens, organic enrichment/low dissolved oxygen, unionized ammonia, nutrients, or siltation. Due to these impairments, many of Salem's waters can no longer support their designated uses.

Salem has become the educational, medical, legal, cultural, and banking hub of the North Shore. Therefore, there is a steady demand for housing, business, and industry in Salem. As observed by the DMF, impervious surfaces in the area have greatly increased over the last 50 years while the population has remained fairly stable. This increase in impervious surfaces can be attributed to development and redevelopment of small lots that are not regulated by state or federal stormwater regulations.

Currently, the Environmental Protection Agency's National Pollution Discharge Elimination System (NPDES) Permitting Program only regulates stormwater runoff from construction sites one acre and larger. The minimum lot size required by the Salem Zoning Board is 15,000 square feet (<0.4 acres), and smaller construction projects are allowed with variances. The City of Salem typically sees development or redevelopment of these very small lots, unlike a rural or suburban community where large subdivisions are constructed. Salem needs to develop and adopt an Urban Stormwater and LID Ordinance (Ordinance) to promote NPS control in this dense urban environment. This Ordinance will advance the City's capacity to address nonpoint source pollution in the form of urban stormwater runoff as they plan for and manage expanding urban development and redevelopment. The Ordinance will undoubtedly have a positive effect on Salem's water quality.

To accompany this Ordinance, the City will develop a Best Development Practices Guidebook (Guidebook) to assist designers and contractors with sustainable development and redevelopment in the City of Salem. The goal of the Guidebook is to clearly communicate the City's expectations to designers and contractors and, in turn, to expedite the review process. The Ordinance and Guidebook are described in further detail in the next section, Project Deliverables.

Several City departments and boards, including the Board of Health, the Conservation Commission, Department of Public Services, Planning Board, and Building Department, will collaborate to create the Ordinance and the Guidebook. Once the Ordinance is fully developed and under the guidance and approval of the Mayor, it will be presented to City Council for adoption into the City of Salem Code of Ordinances.

Development of the Ordinance and the Guidebook will be coordinated by Woodard & Curran. Resumes of Woodard & Curran consultants involved in the project are included in Appendix C. The following City employees will participate in the project with a stakeholder's interest in the process and outcome:

- Bruce Thibodeau, Director of Public Services and City Engineer
- Joe Nerden, Assistant DPW Director & Assistant City Engineer
- Joanne Scott, Health Agent, Board of Health
- Kevin Cornacchio, Conservation Commission Chairman
- Frank Taormina, Conservation Commission Agent
- Lynn Goonin Duncan, Director, Department of Planning and Community Development
- Denise McClure, Deputy Director, Department of Planning and Community Development

Resumes from City employees are available upon request pending award of Coastal NPS Grant. Standard forms completed by the City of Salem are included in Appendix D.

This capacity-building project would provide the Executive Office of Environmental Affairs (EOEA) agencies with the opportunity to assist with the development of a NPS pollution management tool that can be easily transferred to other urban communities. There is currently no dense urban model for low impact development or NPS control in Massachusetts. However, the City will make use of successful management tools from urban communities in other regions of the country (e.g., City of Portland, Oregon. *Sustainable Site Development - Stormwater Practices for New, Redevelopment, and Infill Projects*. November 2003.) to develop a Ordinance for Salem.

3.2 PROJECT DELIVERABLES

3.2.1 Urban Stormwater and Low Impact Development Ordinance

This Ordinance will advance the City's capacity to address NPS pollution as they plan for and manage expanding urban development and redevelopment. This Urban Stormwater and LID Ordinance will include, at a minimum, language to address the following topics:

- Close the gap between local and NPDES stormwater regulations by requiring construction site and post-construction runoff control for all development and redevelopment, including projects disturbing *less than one acre*;
- Encourage Low Impact Development (LID) principals in development and redevelopment projects (e.g., increase groundwater recharge by decreasing impervious surface area, decrease flooding, attenuation of peak storm flows);
- Encourage the principles of Smart Growth (e.g., protecting open space and environmental resources, encouraging development in currently developed areas); and
- Clearly define the roles and authority of the Planning Board, the Engineering Department, and other City departments with respect to reviewing development/building proposals and enforcing the Ordinance.

3.2.2 Best Development Practices Guidebook

This Guidebook will include, at a minimum, language to address the following topics:

- An overview of the City’s Urban Stormwater and Low Impact Development Ordinance;
- Recommended stormwater best management practices (i.e., technologies that can be easily implemented and effective in a dense urban environment);
- Required erosion and sediment control practices;
- Recommended sustainable landscape design using principals of LID;
- Guidelines and criteria for site planning; and
- Checklist for Designers in Salem.

The goal of the Guidebook is to clearly communicate the City’s expectations to designers and contractors and, in turn, to expedite the review process. The Final Guidebook will be available in several locations – the Engineering Department, the Planning Department, and on the City website – to promote its use by designers and contractors.

3.2.3 “How To” Guide for Urban Communities

The final report to CZM will document the process used by the City to develop the Urban Stormwater and LID Ordinance and the Best Development Practices Guidebook. The report will include meeting minutes taken by the Stormwater and LID Advisory Group, a list of reference documents and important contacts, and documentation of challenges encountered by the group throughout the process. The process will also be converted to a presentation targeting local environmental groups and other interested parties, such as densely urbanized communities in the region.

3.3 SCOPE OF WORK

Task 1 - Create In-house Stormwater and LID Advisory Group & Identify Priorities

A Stormwater and LID Advisory Group (Group) will be created to facilitate the development of the Urban Stormwater and LID Ordinance and the Best Development Practices Guidebook. The Group will be comprised of representatives from the Board of Health, the Conservation Commission, Department of Public Services, and Planning Board. Two representatives from Woodard & Curran will organize meetings and prepare deliverables. During the first meeting, the Group will create a meeting schedule.

The Group will develop a list of goals specific to each City department or board. The Group will also identify priority areas in the City as well as specific problems to be addressed in the Ordinance, such as pre- and post-construction stormwater runoff, groundwater recharge, flooding, structural and non-structural drainage capacity issues.

Task 2 - Review Current City Regulations

The Group, assisted by Woodard & Curran, will review the current City regulations and the Salem Code of Ordinances regarding NPS pollution, stormwater, and water quality and quantity management. The City Ordinances, adopted by the City Council, regulate the activities of various Boards and Commissions; establish licensing procedures; regulate and restrict traffic and parking; determine building, zoning, and

development issues, etc. Amendments to current regulations and ordinances will be necessary to enforce the Urban Stormwater and LID Ordinance.

Task 3 - Obtain and Review Sample NPS Related By-laws/Ordinances and/or Regulations

Woodard & Curran, with the help of EOEA when possible, will obtain NPS and LID related by-laws and regulations currently in use in other communities in Massachusetts and from local environmental groups for assistance in writing amendments to the City's current regulations (e.g., Planning and Development, Zoning, et al.). These examples will also be used as a broad base to develop language for Salem's Ordinance.

Task 4 - Urban Stormwater and Low Impact Development (LID) Ordinance

Woodard & Curran will compile notes from the monthly meetings and write a draft Ordinance, as described in the previous section. The Ordinance will include suggested amendments to current regulations and provisions for enforcement. The Group and CZM will review the draft Ordinance and Woodard & Curran will incorporate the comments.

Task 5 – Best Development Practices Guidebook

Woodard & Curran will compile notes from the monthly meetings and write a draft Guidebook. The Guidebook will provide an overview of the new Urban Stormwater and LID Ordinance, recommend best management practices for designers and developers in Salem, and provide technical guidance. The Group and CZM will review the draft guidebook and Woodard & Curran will incorporate the comments.

Task 6 - Present the Urban Stormwater and LID Ordinance to Mayor and City Council

The Group with W&C will present the final Ordinance to the Mayor for consideration and submission to the City Council. It is the intent of the City to have the proposed Ordinance submitted to the City Council by the year's end.

Task 7 - Present the Ordinance and Guidebook to Local Environmental Groups

The Group with W&C will present the final Ordinance and Guidebook, along with the steps the City took to develop these documents, to local environmental groups and other interested parties, such as other densely urbanized communities in the region. The City will work with CZM to choose groups that could benefit the most from this project.

Task 8 - Reporting

Woodard & Curran will prepare progress reports and a final report as described in the *Request For Responses: ENV 05 CZM 03*, Coastal NPS Grant Conditions.

Table 3-1: Scope of Work Summary Table

Task Description	Responsible Party	Deliverables & Project Milestones
Task 1: Create In-house Stormwater and LID Advisory Group & Identify Priorities	Group and Woodard & Curran (W&C)	Create Meeting Schedule List of Goals for the Ordinance specific to each City department/board Identify priority issues and areas in Salem
Task 2: Review Current City Regulations	Group and W&C	Review applicable regulations and determine areas to strengthen according to Ordinance goals
Task 3: Obtain and Review Sample NPS Related By-laws/Ordinances	W&C	Create a bibliography of reference documents
Task 4: Urban Stormwater and LID Ordinance	Group and W&C	Draft Ordinance for review by the Group Incorporate Group's comments for the Final Ordinance
Task 5: Best Development Practices Guidebook	Group and W&C	Draft Guidebook for review by the Group Incorporate Group's comments for the Final Guidebook
Task 6: Present the Urban Stormwater and LID Ordinance to Mayor and City Council	Group and W&C	-
Task 7 - Present the Ordinance and Guidebook to Local Environmental Groups	Group and W&C	Prepare presentation with visuals and handouts (if necessary)
Task 8: Reporting	W&C	Woodard & Curran will prepare and submit progress reports and the final report to CZM on behalf of the City

3.4 PROJECT TIMELINE

The following project timeline assumes that Coastal NPS Grants will be awarded in January 2005. Stormwater and LID Advisory Group meetings are not included in the timeline.

Table 3-2: Project Timeline

<u>Approximate Date</u>	<u>Task to be Completed</u>
February 2005	<ul style="list-style-type: none">• Create In-house Stormwater and LID Advisory Group & Identify Priorities
March 2005	<ul style="list-style-type: none">• Review Current City Regulations• Obtain Sample NPS Related By-laws/Ordinances and/or Regulations
April 2005	<ul style="list-style-type: none">• Submit Progress Report to CZM• Review NPS Related By-laws/Ordinances and/or Regulations
September 2005	<ul style="list-style-type: none">• Complete Draft Urban Stormwater and LID Ordinance and submit to Group and CZM for comments
October 2005	<ul style="list-style-type: none">• Submit Progress Report to CZM• Review all comments on the Draft Ordinance• Complete Draft Best Development Practices Guidebook and submit to Group and CZM for comments
November 2005	<ul style="list-style-type: none">• Complete Final Ordinance• Present Final Urban Stormwater and LID Ordinance to Mayor
December 2005	<ul style="list-style-type: none">• Submit Final Report to CZM with Final Ordinance and Guidebook• Present the project – Ordinance, Guidebook, and process – to local environmental groups and interested parties

4. PROJECT RESULTS

Describe the anticipated results of the project. Clearly and explicitly describe how the effectiveness of the project will be evaluated.

Full implementation of the Urban Stormwater and LID Ordinance and Best Development Practices Guidebook by the City will result in the following measurable NPS controls:

Short Term Measurable Goals

- Adoption of the Urban Stormwater and LID Ordinance into the Salem Code of Ordinances and/or the City regulations.
- Widespread use of the Guidebook by designers and contractors. Upon review of proposed development and redevelopment projects, the Planning Department and Engineering will see the best management practices as described in the Guidebook being voluntarily implemented. This will facilitate the review process for all parties.
- Increased implementation of NPS controls in all new development and redevelopment, especially using the principals of LID. For example, compare percentage of stormwater best management practices implemented for each developed acre in the years before and after the Urban Stormwater and LID Ordinance was adopted and the Best Development Practices Guidebook was made available.

Long Term Measurable Goals

- Experience the benefits of Smart Growth by protecting the City's open space and natural resources in undeveloped areas and encouraging development in currently developed areas. Optimize current public investments such as infrastructure (e.g., roadways, sewer and drain lines), parks, schools, and public transportation.
- Increased groundwater recharge and decrease impervious surfaces in all new development and redevelopment. For example, compare the ratio of permeable to impervious surface area in years before and after the Watershed Protection Ordinance was adopted.
- Decrease in City-wide flooding, especially in the downtown area.
- Decrease in NPS pollution, resulting in improved water quality (i.e., fewer rain-induced beach closures, decrease number of waters on the State 303(d) List, support aquatic life in Salem's fresh water and marine habitats, improve condition of Salem's shellfish beds).

5. BUDGET DETAILS

The total cost of the project is \$46,000.00. The grant funds requested and the match provided are as follows:

Amount Requested:	\$ 34,500
Total Project Cost:	\$ 46,000
Match Required:	\$ 11,500 (25% of total project cost)

Although the required match will be provided in cash, the City of Salem will also donate the time spent by the Stormwater and LID Advisory Group in support of the project. This is upwards of 100 hours of the City's staff time.

The City acknowledges that the funding is provided on a reimbursement basis of 75 percent of the project cost and that the City must appropriate the entire project amount initially to fund the project. Table 5-1 provides a cost breakdown that includes the labor cost and out-of-pocket expenses for our consultant, Woodard & Curran.

Table 5-1: Itemized Budget Breakdown

Task No.	Task Description	Labor Hours	Labor Budget	Expenses (travel, postage, printing)	Total Budget
1	Create In-house Stormwater and LID Advisory Group & Identify Priorities; Monthly Advisory Group Meetings	70	\$7,400	\$600	\$8,000
2	Review Current City Regulations	18	\$1,500	-	\$1,500
3	Obtain and Review Sample NPS Related By-laws/Ordinances and/or Regulations	12	\$1,000	-	\$1000
4	Draft & Final Urban Stormwater and LID Ordinance	110	\$8,500	\$100	\$8,600
5	Draft & Final Best Development Practices Guidebook	110	\$8,500	\$300	\$8,800
6	Present the Urban Stormwater and LID Ordinance to Mayor & City Council	20	\$2,000	-	\$2,000
7	Present the Ordinance and Guidebook to Local Groups	22	\$2,300	-	\$2,300
8	Progress Reports and Final Report	90	\$8,000	\$100	\$8,100
	Project Management: Scope, project coordination, and budget	50	\$5,700	-	\$5,700
	Totals:	532	\$44,900	\$1,100	\$46,000

6. PUBLIC SUPPORT

Demonstrate broad support for the project among towns and municipalities, regional and local groups, and the public at-large; demonstrate that project implementation will result in a public benefit to the Commonwealth.

Letters of support have been provided by the Mayor, Salem Sound Coastwatch, the Massachusetts Division of Marine Fisheries, the Conservation Commission, Planning and Community Development and the Board of Health and are presented in Appendix E. The letters of support demonstrate strong interest in implementing this project.

The Executive Office of Environmental Affairs (EOEA) is addressing the many water resource-related challenges in Massachusetts by developing a water policy that both promotes wise management and efficient use of our water resources and provides a framework of principles, goals, and actions for managing water in Massachusetts. It is the City's opinion that this proposed project is, at a minimum, consistent with "Recommendations 5: Promote Stormwater Recharge Close to its Site of Origin" as presented in the draft *Report of the Water Policy Task Force*. By encouraging LID techniques, precipitation will seep into the ground rather than becoming a "conduit for pollutants from parking lots, and other impervious surfaces, to water bodies."

APPENDIX A: MAPS

Site Locus Map
Impaired Waters Map
Land Use Map
North Coastal Watershed Map
MA DMF – Designated Shellfish Growing Maps

APPENDIX B: WATER QUALITY DATA

APPENDIX C: RESUMES

APPENDIX D: STANDARD FORMS

APPENDIX E: LETTERS OF SUPPORT